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Surgical site infection due to *Mycobacterium peregrinum*: a case report and literature review

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KEYWORDS
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Summary
Objectives: *Mycobacterium peregrinum* is a species included in the *Mycobacterium fortuitum* complex, a member of the group of rapidly growing non-tuberculous mycobacteria (RGM). Only a few cases of infection with *M. peregrinum* have been reported, and no relevant review has been published.
Methods: Following the treatment of a patient with *M. peregrinum* infection after plastic surgery, we undertook a review of the literature of previously reported cases of *M. peregrinum* infection.
Results: Ten previously reported cases were identified. Like other cases of the *M. fortuitum* complex infections, the majority of *M. peregrinum* infections were related to surgical site infections and catheter-related infections. In the literature, most of the antibiotic regimens were based on a combination of quinolones with various antibiotics, and the duration of treatment ranged from 6 weeks to 4 months.
Conclusion: The fact that the optimal treatment for *M. peregrinum* infection has not yet been established has resulted in the use of a diverse range of therapies. It is important that clinicians carefully review each case so that a more appropriate treatment for *M. peregrinum* infections can be determined.

Introduction

Mycobacterium peregrinum is a species included in the *Mycobacterium fortuitum* complex, a member of the group of rapidly growing non-tuberculous mycobacteria (RGM).

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Table 1 Previous reports of *Mycobacterium peregrinum* infections: clinical manifestations and the presence of underlying conditions

Year	Country	Site of infection (type of surgery)	Immunodeficiency	Artificial material	Antibiotics	Duration of treatment	Surgical procedure	Ref.
1983	USA	Skin and soft tissue (mammoplasty)	-	-	NA	NA	NA	9
1998	Japan	Skin and soft tissue	-	-	SPFX, MINO	15 weeks	None	10
1998	France	Skin and soft tissue	-	Yes	NA	NA	NA	11
1999	Japan	Peritonitis (gastric cancer surgery)	-	Yes	SPFX, CAM, IMP/CS	NA	Drainage	12
2001	Spain	Catheter-related bacteremia	-	Yes	VCM, CAZ	NA	Catheter removal	13
2003	Germany	Primary bacteremia	Myelomonocytic leukemia	-	NA	NA	None	14
2005	USA	Infection of implantable cardioverter device (ICD)	-	Yes	CPFX, CAM	6 weeks	ICD removal	15
2005	France	Pneumonia	Polymyositis treated with infliximab	-	IRE	Death	None	16
2005	Japan	Tonsillar abscess	HIV/AIDS	-	IMP/CS, CAM	6 weeks	Drainage	17
2006	Spain	Skin and soft tissue (mesotherapy)	-	-	CPFX	3–4 months	None	18
2007	Japan	Skin and soft tissue (reconstruction of abdominal wall)	-	Yes	AMK, IMP/CS, LVFX	5 weeks	Removal of artificial sheet	This case

NA, not available; SPFX, sparfloxacin; MINO, minocycline; CAM, clarithromycin; IMP/CS, imipenem/cilastatin sodium ; VCM, vancomycin; CAZ, ceftazidime; CPFX, ciprofloxacin; IRE, isoniazid–rifampin–ethambutol; AMK, amikacin; LVFX, levofloxacin.

Members of the *M. fortuitum* complex are ubiquitous in nature and have been isolated in soil and various water-related sources, including municipal tap water and hospital water systems.[1,2] Recently, the number of non-tuberculous mycobacterium infection cases reported has been on the rise, and the clinical importance of these organisms is growing.[3–5] We report here a case of surgical site infection by *M. peregrinum*. This should alert clinicians to the fact that *M. peregrinum* may be the culprit of skin and soft tissue infections, especially after plastic surgery.

The case

A 58-year-old female underwent a surgical resection of a 13 cm × 13 cm lipoma on her right chest wall. Her chest wall and lower ribs were reconstructed using 30 cm × 20 cm artificial sheets and artificial plates. Seven weeks after the procedure, the patient developed pain and swelling of the chest wall followed by a serious discharge running off via a fistula on her chest wall, 5 cm below the operative scar. She was immediately admitted to our hospital with a diagnosis of surgical site infection. Empirical therapy with cefazolin was begun at the time of admission. The discharge was submitted for Gram stain and routine bacteriology, which were unrevealing. However, acid-fast staining was positive for numerous mycobacteria. A mycobacterium was cultured at 7 days and identified as *M. peregrinum* by DNA–DNA hybridization.[6] *M. peregrinum* was obtained repeatedly from subsequent exudates. Susceptibility testing by the broth microdilution method complying with the guidelines of the Clinical and Laboratory Standards Institute was undertaken, which revealed sensitivity to amikacin (minimum inhibitory concentration (MIC) = 1), imipenem (MIC = 4), and levofloxacin (MIC = 0.125) and resistance to clarithromycin (MIC > 32) and doxycycline (MIC > 256).[7] According to the susceptibility testing, parenteral amikacin and imipenem were started and the implant was removed followed by vigorous surgical debridement. Ziehl–Neelsen stain of the debrided tissue was positive for acid-fast bacilli, however the Gram stain was negative. Histological examination of the tissue showed many foreign body giant cells and neutrophils, yet caseous necrosis and Langhans cells were not apparent. The postoperative course was uneventful and imipenem was substituted for oral levofloxacin a week later. Antibiotics were discontinued within 4 weeks postoperatively. The patient remained well without further complication 6 months later.

Discussion

M. peregrinum is a rare organism isolated in only 1–2% of RGM infections.[8] Currently, there is no published series or review evaluating the clinical significance of *M. peregrinum*, and it is unclear whether *M. peregrinum* infection causes a similar kind of infection to that found in our case. Using the MEDLINE database with the keywords '*Mycobacterium peregrinum*' and a bibliographic review of relevant clinical articles, we searched the literature for reports referring to *M. peregrinum*. Only a small number of cases of sporadic infection have been reported; these are shown in Table 1.[9–18] Hence, a total of 11 cases including the patient in our series have been reported. These include four cases of skin and soft

tissue diseases,[9–11,18] two cases of medical device-related infection,[13,15] and one case of peritonitis.[12] Like other members of the *M. fortuitum* complex, the majority of *M. peregrinum* infections are related to surgical site infections and catheter-related infections.[8,19,20] *M. peregrinum* has also been reported to cause a primary bacteremia, pneumonia, and tonsillar abscess in immunosuppressed patients.[15,17,18]

The *M. fortuitum* complex is more sensitive than other RGM, hence treatment of these infections is generally easy and effective.[8,19,20] We determined an antibiotic regimen for our patient using the current recommendations found in the review of *M. fortuitum* infection and by susceptibility testing, which proved to be effective. In the literature cases, antibiotics were selected in reference with susceptibility testing undertaken using the E-test and broth microdilution methods. A combination of quinolones with various antibiotics was used in many of the cases, and the duration of treatment ranged from 6 weeks to 4 months. The fact that the optimal treatment for *M. peregrinum* infection has not yet been established has resulted in the use of a diverse range of therapies.[8,19,20] In our case, the organism was resistant to clarithromycin and minocycline, to which 80% and 46% of the *M. fortuitum* complex have been reported to be resistant; thus imipenem and amikacin were chosen. Although it has been reported that RGM have a distinctive antimicrobial susceptibility profile depending on the species, susceptibility testing should be performed for each strain. In the review of RGM cases, the reported optimal duration of antibiotic therapy in skin and soft tissue infections due to *M. fortuitum* ranged from 6 weeks to 4 months, depending on the study. In our case, therapy lasted 5 weeks. This shorter duration of antibiotic therapy was sufficient, mainly because a complete resection of the infected tissue was performed and the lesion was localized.

It is important that clinicians make an accurate diagnosis and carefully review each case so that a more appropriate treatment for *M. peregrinum* infections can be determined.

A case such as ours reminds us that a healthy suspicion for unusual pathogens, such as the atypical mycobacteria, is necessary when considering late-onset postoperative infection.

Conflict of interest: No conflict of interest to declare.

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